

REMARKS

The present Amendment is in response to the Office Action having a mailing date of October 23, 2002. Claims 1-12 are pending in the present Application. Applicant has amended claims 5, 8, and 10. Applicant has canceled claims 1, 2, 3, 4, and 9. Applicant has also added claims 13-14. Consequently, claims 5-8, and 10-14 remain pending in the present Application.

In the above-identified Office Action, the Examiner indicated that claims 9-10 would be allowable if rewritten in independent form.

Applicant gratefully appreciates the Examiner's indication that claims 9 and 10 contain allowable subject matter. Claims 9 and 10 depend upon independent claim 5. Applicant has thus amended independent claim 5 to include the limitations of claim 9 and canceled claim 9. Applicant has amended claim 10 to include the limitations of independent claim 5. Consequently, Applicant respectfully submits that claims 9 and 10 are allowable as currently presented.

Claims 6-8 and 11 depend upon independent claim 5. Consequently, the arguments herein apply with full force to claims 6-8 and 11. Accordingly, Applicant respectfully submits that claims 6-8 and 11 are allowable as currently presented.

Applicant has amended claim 8 to correct a minor typographical error. Applicant also amended claim 5 to incorporate the limitations of claim 9 and amended claim 10 to be in independent form, incorporating the limitations of the base claim and any intervening claims. Applicant has added claim 13, which is analogous to claim 12, but is for a plurality of magnetic tunneling junctions. However, claim 13 also recites that the number of magnetic tunneling junctions is less than the number of bit stored by the combination of the magnetic tunneling junctions. Claim 14 recites a magnetic memory including a first number of magnetic tunneling junctions, a reference magnetic tunneling junction, and means for comparing the output of each of

the magnetic tunneling junctions with the reference magnetic tunneling junction. Claim 14 also recites that the number of bits stored by the plurality of magnetic tunneling junctions is greater than the first number plus one. Support for new claims 13 and 14 can be found in the specification, page 7, lines 5-22; page 8, line 5-19; and Figures 3-4. Accordingly, Applicant respectfully submits that no new matter is added.

In the above-identified Office Action, the Examiner rejected claims 1-4 and 12 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,055,178 (Naji I). The Examiner also rejected claims 5-6 and 11 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,111,781 (Naji II). In the above-identified Office Action, the Examiner further rejected claims 7 and 8 under 35 U.S.C. § 102 as being unpatentable over Naji II in view of Naji I.

In the above-identified Office Action, the Examiner rejected claims 1-4 and 12 under 35 U.S.C. § 102 as being anticipated by Naji I.

Applicant has canceled claims 1-4. Accordingly, Applicant respectfully submits that the Examiner's rejection of claims 1-4 is moot.

Applicant respectfully disagrees with the Examiner's rejection of claim 12. Claim 12 recites the steps of programming a magnetic tunneling junction, programming a reference magnetic tunneling junction, and comparing the output of the magnetic tunneling junction to the output of the (programmed) reference magnetic tunneling junction. Because the reference magnetic tunneling junction is programmed, the magnetic tunneling junction could have an output that is greater than, less than, or substantially equal to that of the reference magnetic tunneling junction. Specification, page 5, line 11-page 6, line 10. Thus, magnetic memory becomes capable of storing a greater number of bits. Specification, page 6, lines 10-13; page 7, lines 10-12; and page 8, lines 13-18.

Although Naji I and Naji II describe the use of magnetic tunneling junctions as a reference junction and magnetic tunneling junction cells, Naji I and Naji II fails to teach or suggest a method which programs a magnetic tunneling junction, programs the reference magnetic tunneling junction, and reads the plurality of magnetic tunneling junction by comparing its output to the output of the programmed reference magnetic tunneling junction. Applicant can find no mention in the cited portions of Naji I and Naji II of programming the reference magnetic tunneling junction. Instead, for example, Naji I merely indicates that the combination of the reference junction and transistors will have a resistance somewhere between the resistance of a magnetic tunneling junction programmed in one of two available states (antiparallel/high resistance and parallel/low resistance states). Naji I, col. 3, lines 48-54. Consequently, there is no indication in the cited portions of Naji I and Naji II that the reference magnetic tunneling junction is programmed in a manner that is analogous to the magnetic tunneling junction that stores the data. There is, therefore, no possibility of storing a greater number of bits in the magnetic tunneling junction using the read/write scheme of Naji I and Naji II. Consequently, Naji I, Naji II and the combination of Naji I and Naji II fail to teach or suggest a reading scheme which actually programs the reference magnetic tunneling junction. Naji I, Naji II and the combination of Naji I and Naji II fail to teach or suggest the method recited in claim 12.

Accordingly, Applicant respectfully submits that claim 12 is allowable over the cited references.

The Examiner also rejected claims 5-6 and 11 under 35 U.S.C. § 102 as being anticipated by Naji II. As described above, independent claim 5 and, therefore, claim 6 are allowable over the cited references. Accordingly, Applicant respectfully submits that claims 5-6 are allowable over the cited references.

In the above-identified Office Action, the Examiner further rejected claims 7 and 8 under 35 U.S.C. § 102 as being unpatentable over Naji II in view of Naji I. Claims 7-8 depend upon independent claim 5, which is allowable. Thus, as described above, claims 7-8 are allowable over the cited references.

New claim 13 is analogous to independent claim 12. However, claim 13 recites the programming of a plurality of magnetic tunneling junctions (instead of one) and a comparison of the output of each of the magnetic tunneling junctions with that of the (programmed) reference magnetic tunneling junction. Furthermore, claim 13 recites that the plurality of magnetic tunneling junctions further includes a first number of magnetic tunneling junctions capable of storing a number of bits. Claim 13 also recite that the magnetic tunneling junctions are capable of storing a number of bits greater than the first number. Using the method recited in claim 13, the programming of the magnetic tunneling junctions and reference magnetic tunneling junction, as well as the comparison between the outputs of the magnetic tunneling junctions and the reference magnetic tunneling junction allows a greater number of bits to be stored.

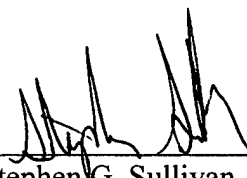
As described above, Applicant can find no mention in Naji I and Naji II of programming the reference magnetic tunneling junction. Consequently, Naji I and Naji II are devoid of mention of the possibility of a read scheme that allows a greater number of bits to be stored than the number of magnetic tunneling junctions (including the reference magnetic tunneling junction). Consequently, Naji I, Naji II and the combination of Naji I and Naji II fail to teach or suggest such a reading scheme. Naji I, Naji II, and the combination of Naji I and Naji II fail to teach or suggest the method recited in claim 13. Accordingly, Applicant respectfully submits that claim 13 is allowable as presented.

New claim 14 recites a magnetic memory unit that is analogous to the method recited in claim 13. Consequently, the arguments herein apply with full force to claim 14. Accordingly, Applicant respectfully submits that claim 14 is allowable as presented.

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,

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October 30, 2003

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FEB 19 2004

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